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NUTRIENT EVALUATION OF ENERGY RICH UNCONVENTIONAL FEEDS AVAILABLE IN WAYANAD

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ABSTRACT
The cattle population in Kerala as per the latest census, ie. 2012 census was 14.30 lakhs, which was only 0.48 per cent of the Indian cattle population. Kerala with a milk production of 27.11 lakh tonnes which came to nearly 1.85 per cent of the Indian milk production pulls the weight by nearly three times in milk production as compared to the population strength. Kerala has a deficit of 75 percent green fodder and 81 percent dry fodder. In this scenario the requirement should be met from unconventional feeds. The nutrient quality of commonly available energy rich unconventional feeds in Wayanad were evaluated, in this study. Four energy rich unconventional feeds, viz. pineapple waste, cashew apple waste, jackfruit waste and banana stem waste were analysed for proximate principles, neutral detergent fibre (NDF), acid detergent fibre (ADF) and metabolisable energy (ME), digestible organic matter (DOM) and *in vitro* digestible nitrogen (IVDN) by *in vitro* gas production technique (IVGPT). Judicious incorporation of these unconventional feeds in the rations of dairy cows will help to meet the roughage deficiency and help to achieve maximum production, reduce the cost of production of milk which will ultimately result in growth of cattle population in Kerala.

KEYWORDS: Unconventional feeds, proximate analysis, IVGPT, economic rearing, milk production.

INTRODUCTION

India ranks first in cattle population and milk production in the world, accounting for 18.50 % of the world's milk production with an annual output of 155.50 million tonnes in 2015-16 (DAHD, 2017). Indian has a population of 299.60 million heads of cattle as per the latest livestock census, *i.e*., 2012 census (DAHD, 2017). The cattle population in Kerala as per the latest census, *i.e*. 2012 census was 14.30 lakhs, which was only 0.48 % of the Indian cattle population of 299.60 million (Government of Kerala, 2016). However, Kerala had a milk production of 27.11 lakh tonnes in the year 2015-16 which came to nearly 1.85% of the Indian milk production. This indicates that cows in Kerala, pulls the weight by nearly three times in milk production as compared to the population strength. In Kerala, feeding management involves feeding of concentrate mixtures available in the market along with locally available oil cakes such as ground nut cake and roughages such as straw and little green fodder, if available. Increased cost of concentrate cattle feed (Rs. 21 per kg) and paddy straw (Rs. 16 to 17 per kg) are the major stumbling blocks in the state as far as profitable dairying is concerned. These reasons have contributed to several dairy farmers quitting the scene as a result of which cattle population in the state is decreasing day by day, even though the demand for milk and milk products is *vice versa.*

In the present scenario, where crop farming is best with stagnating growth, dairying assumes great significance and is considered as a vital component in the diversification of Indian agriculture (Birthal, 2008). Nearly 70 percent of the total cost of rearing a cow comes under feed cost (Mondal *et al.*, 2010). Feeding practices in India are primarily based on crop residues which give poor milk yield from the animals and the productivity of our animals continues to be low, the average yield being 7.33 litres per day (DAHD, 2017). Samal and Patnaik (2014) reported that inadequate nutrient supply and shortage of land for cultivation are the major hindrances for growth of the dairy sector apart from lack of scientific knowledge for the poor farmer and poor genetic potential of the animals. The green fodder requirement of Kerala in the year 2014 was 7.04 million tonnes per year, but only 25% of this (1.75 million tonnes) was produced per year and there existed a deficit of 5.29 million tonnes (75 per cent). In 2014, the state had a dry fodder requirement of 5.29 million tonnes per year, but only 19 percent was produced with a deficiency of 81% (Government of Kerala, 2015). A practical solution for this is to incorporate unconventional feed ingredients in feed for replacing energy rich conventional feed. The importance of unconventional feeds are increasing day by day because in India there exists a huge gap between requirement and availability of conventional feed sources of green fodder, dry fodder and concentrate and the usage of agro industrial byproducts as ruminant feed will reduce the gap to an appreciable level (NDDB, 2012).

If a cattle feed can be formulated using locally available unconventional feed ingredients, without compromising on milk production, it shall help a great deal in economic milk production and shall also serve as a good medium for agro-industrial waste utilization. Therefore the study was undertaken for nutritive evaluation of energy and protein rich unconventional feed ingredients available in Wayanad.

MATERIALS & METHODS

Four locally available and cheap unconventional feed ingredients which are rich sources of energy, *viz*. pineapple waste, cashew apple waste, banana stem waste and jack fruit waste were procured. The proximate analysis of the above feeds was determined by standard procedure (AOAC 2016) and neutral detergent fibre (NDF) and acid detergent fibre (ADF) as per the methods of Van Soest *et al.* (1991).

In vitro total gas production technique (IVGPT) as described by Menke and Steingass, (1988) was conducted to estimate metabolisable energy (ME) and digestible organic matter (DOM) content in them. *In vitro* degradable nitrogen was also calculated from the gas produced as per Raab *et al.* (1983).

RESULTS & DISCUSSION

The proximate analysis (crude protein, crude fibre, ether extract and total ash), NDF, ADF are given in Table.1 and the results of IVGPT (ME, DOM, IVDN) are given in the Table. 2.

TABLE 1. Proximate analysis and fibre fraction

Unconventional feed	Proximate analysis (%)				Fibre fraction	
	CP	CF	EE	TA	NDF	ADF
Pineapple waste	11.43	14.07	1.98	4.20	56.74	18.71
Cashew apple waste	15.55	17.33	2.18	4.61	65.87	38.48
Banana stem waste	10.71	31.77	0.37	10.99	72.67	46.83
Jackfruit waste	12.58	12.46	4.90	3.58	46.81	30.26

TABLE 2. IVGPT of unconventional feeds

Unconventional feed	IVGPT		
	ME (MJ/kg)	DOM (%)	IVDN (% of total N)
Pineapple waste	9.66 ±0.34	67.65 ±2.07	45.61 ±5.49
Cashew apple waste	5.47 ±0.35	50.81 ±9.16	44.40 ±4.33
Banana stem waste	8.20 ±0.09	54.91 ±4.07	50.18 ±1.33
Jackfruit waste	7.52 ±0.51	57.88 ±2.88	45.75 ±1.52

Higher energy was found in pineapple waste and banana stem waste, with a ME of 9.66 and 8.20 MJ/kg. Judicious incorporation of these unconventional feeds in the rations of dairy cows will help to meet the roughage deficiency and help to achieve maximum production, reduce the cost of production of milk which will ultimately result in growth of cattle population in Kerala. However, the level of inclusion and anti nutritional factors present should be taken into account before incorporation the ration.

CONCLUSION

Nutritive evaluation of energy rich unconventional feed ingredients available in Wayanad will help to create a nutrient profile of unconventional feeds. If a cattle feed can be formulated using such locally available unconventional feed ingredients, without compromising on milk production, it shall help a great deal in economic milk production and shall also serve as a good medium for agro-industrial waste utilization.

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